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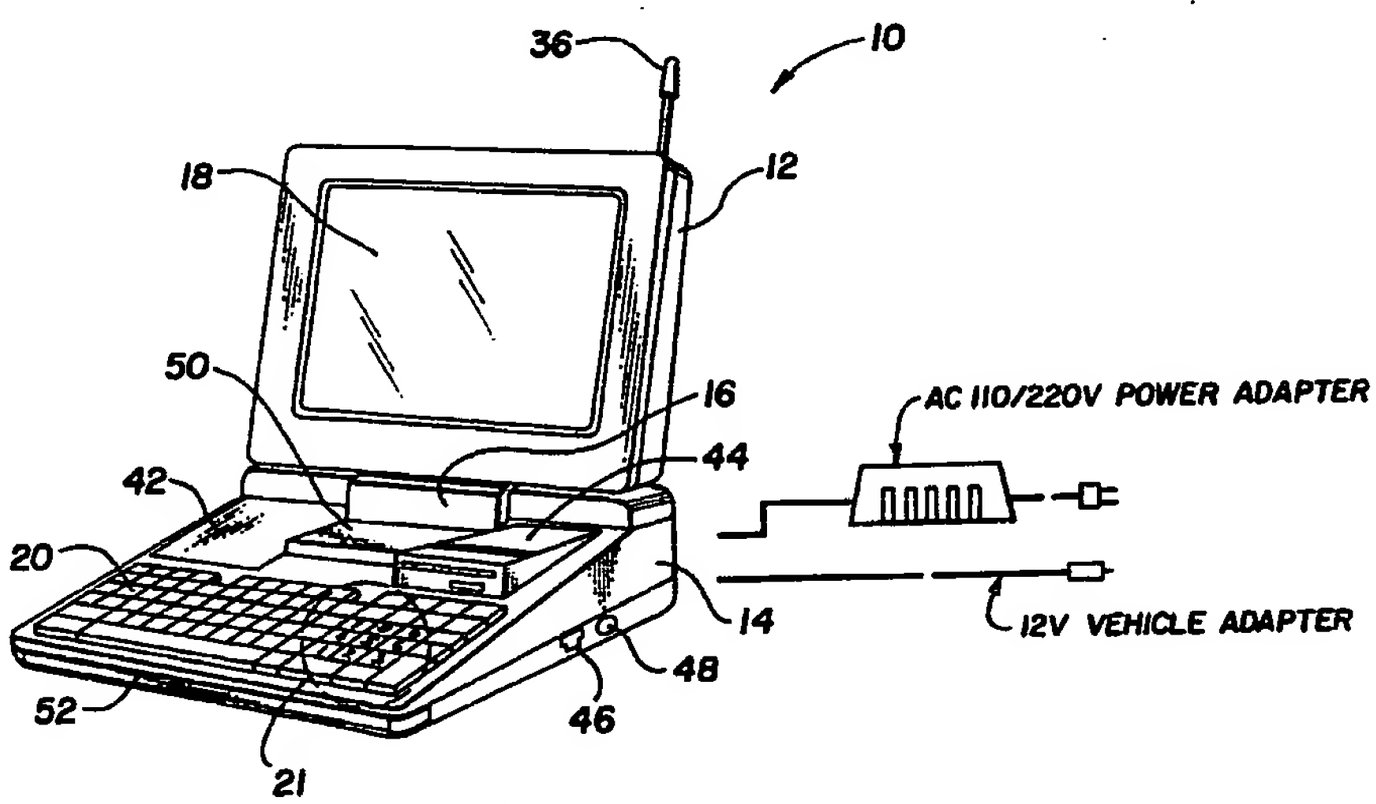
Published
With international search report.

(54) Title: INTEGRATED DATA TRANSMISSION COMPUTER AND SYSTEM



(57) Abstract

A computer (10) is disclosed having first and second housing compartments (12 and 14) connected by a hinge (16) for pivoting between relative open and closed positions, a display screen (18) in one of the housing compartments and a manual keyboard (20) arranged within the other. A cellular telephone is arranged within one of the housing compartments along with a modem and an extendable antenna (36) is located in the housing department with the display screen. In one arrangement a microphone and a speaker (50) are arranged within the housing and operably connected to the cellular telephone. A data network includes at least one such computer which communicates with the rest of the network by means of the cellular telephone.

* See back of page

Description

Integrated Data Transmission Computer and System

Technical Field

The present invention related to data transmission systems, and, in particular, to an integrated computer and cellular telephone for data transmission.

Background Art

Portable computers such as lap-top computers are well established. Similarly, data networks such as those know as local area networks (LAN) are also well known. It is also well know to control radiotelephone transceivers by microprocessors as is disclosed in United States Patent No. 4,486,624 of Puhl et al.

There have been numerous attempts in the past to combine general purpose computers, normally portable or lap-top computers with various degrees of telephone transmission capability. It is certainly common and well established to have built-in modem to modulate and demodulate signals between the computer and a telephone. U. S. Patent No. 4,533,791 issued to Read et al shows a computer with a built-in conventional telephone. U. S. Patent NO. 4,577,068 of Kelly et al shows a telephone cradle which can be used with a computer or "communication terminal." U. S. Patent No. 4,571,456 of Paulsen et al shows a lap-top computer adapted to incorporate an acoustic coupler or telephone handset. A portable "information display" which incorporates what appears to be a standard modem is shown in U. S. Patent NO. 4,496,943 of Greenblatt. U. S. Patent No. 4,602,127 of Neely et al discloses a vehicle computer which makes use of a communication's controller. A computer equipped with an infrared or other line of sight transmitter is shown in U. S. Patent No. 4,456,793 of Baker et al. The actual physical mechanism shown is not too

specific but does not appear to be incorporated into the computer frame itself.

Disclosure of the Invention

A computer, according to the present invention, includes an information display such an LCD screen, a keyboard for manual input of information into the computer, a cellular telephone incorporated within the computer, a modem for modulating/demodulating signals fed to and from the cellular telephone, and an antenna for transmitting/receiving signals from the cellular telephone. In preferred from, radiation shielding substantially blocks direct radiation from the antenna to the rest of the computer. It is preferred that some radiation shielding also substantially block radiation from the cellular telephone to the rest of the computer. In one form, a microphone and a speaker are operably connected o the cellular telephone for transmitting/receiving voice signals.

A portable form of a computer, according to the present invention, includes a housing having first and second compartments connected by a hinge for pivoting the compartments to relative open and closed positions. A preferred form has the antenna arranged within the same housing as the information display. The antenna is extendable from that housing compartment when in use.

A data network, according to the present invention, includes a plurality of computers, at least one of which comprises a housing, a cellular telephone arranged within the housing, a modem with the housing for modulating/demodulating signals fed to and from the cellular telephone, and some means for transmitting/receiving signals to and from the cellular telephone. At least one computer communicates with the other computers of the plurality by means of the cellular telephone.

These and other objects, and advantages and features of this invention will be apparent from the following description taken with reference to the accompanying drawing, wherein is shown the preferred embodiments of the invention.

Brief Description of Drawing

FIGURE 1 is a front right perspective view of a portable computer according to the present invention in a relative open position;

FIGURE 2 is a right side elevational view of the portable computer of FIGURE 1;

FIGURE 3 is a bottom plan view of the portable computer of FIGURE 1 with the bottom panel removed;

FIGURE 4 is a diagrammatic representation of a data network according to the present invention;

FIGURE 5 is a diagrammatic view of an alternative embodiment of a data network according to the present invention; and

FIGURE 6 is a diagrammatic representation of a data network according to the present invention being used for the transmission of voice signals.

Best Mode for Carrying Out the Invention

Referring now to the drawing, and in particular to FIGURE 1, a portable computer according to the present invention is referred to generally by reference numeral 10. Portable computer 10 includes a housing having first and second compartments 12 and 14 connected by hinge means 16 for pivoting the compartments to relative open and closed positions as is well known in the art. means such as detachable liquid crystal display screen 18 displays information from the computer when the compartments are in the open position, and a manual keyboard 20 allows for the input of information into the computer.

Referring also to FIGURE 2 and FIGURE 3, a cellular telephone forms an integral part of computer 10 and in-

cludes transceiver 22, cellular telephone batteries 24, and a cellular power board 26. A modem 28 is arranged within the housing, in this case second housing compartment 14 for modulating/demodulating signals sent to and from cellular telephone transceiver 22. In a preferred from, cellular transceiver 22 is encased within its own housing which shields the rest of the computer from radiation. In one form, this is simply a matter of coating its own housing with aluminum oxide. Battery pack 30 and voltage converter 32 provide power for the remaining computer operations. In this case, they are located within second housing compartment 14 as are computer cards 34.

Portable computer 10 also includes means such as antenna 36 and transmitting/receiving signals from cellular telephone transceiver 22. In a preferred from, antenna 36 is arranged within and extendable from first housing compartment 12 in a conventional telescoping antenna arrangement. Radiation shielding 38 forms a cylinder around that portion of antenna 36 within first housing compartment 12. A currently suitable form of radiation shielding is rubberized aluminum, but a layer of aluminum oxide over housing of transceiver 22, adequate shielding of other vital computer elements from transceiver and antenna radiation must be balanced against maintaining a light portable weight for the overall computer.

IN a preferred from, the attitude of first housing compartment 12 and, hence detachable LCD screen 19 is adjustable for personal preference and lighting between the position shown and continuous positions back to that indicated by reference numeral 40.

In one arrangement, portable computer 10 also includes such features as a built-in hard disk 42, a pop-up floppy disk drive 44, a modular jack 36 for a telephone handset to be connected to cellular transceiver 22, and an audio

signal jack 48 for a headset. In a preferred form, computer 10 also includes a microphone and a speaker such as pop-up speaker phone 50 operably connected to cellular telephone transceiver 22 for transmitting/receiving voice signals. Finally, a retractable handle 52 adds to easy portability. In one arrangement of keyboard 20, a numeric touch pad 21 also serves as a touch tone telephone pad for the cellular telephone.

Referring now to FIGURE 4, a data network according to the present invention is referred to generally by reference numeral 54. Data network 54 includes a plurality of computers 56, at least one of which is similar to portable computer 10, having a housing, in this case comprising first housing compartment 12 and second housing compartment 14, a cellular telephone arranged within the housing as previously described, a modem arranged within the housing as previously described for modulating/demodulating signals fed to and from the cellular telephone, and means such as antenna 36 for transmitting/receiving signals from the cellular telephone. In the particular embodiment illustrated, all of the computers communicate by means of cellular telephones through a cellular phone station 50 which forms a part of the communications link used by the data network.

Referring also to FIGURE 5, an alternative embodiment of a data network according to the present invention is referred to generally by reference numeral 60 in which cellular phone station 58 and its telephone exchange station 62 from part of the communications link used by he data network. In the embodiment illustrated, however, in addition to the plurality 56 of computers 10 there a larger plurality of computers, some of which make up a conventional local area network 64 and another of which functions as a host computer 66. Host computer 66 and local area

network 64 communicate through telephone exchange station 62 by means of modems 68 and 70 respectively.

Referring now to FIGURE 6, data network 68 which could, in reality, be either data network 54 or data network 60 previously illustrated can also provide voice communications for field units using portable computer 10 communicating with other similar field units using portable computer 10 communicating with other similar field units within plurality of computers 56 or a mobile telephone 70 or a conventional house telephone 72.

From the foregoing it will be seen that this invention is one well adapted to attain all the end and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is in the scope of the claims.

As many possible embodiments may e made of the invention without departing from the scope thereof, it is to be understood that all matter herein set froth or shown in the figures of the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

CLAIMS

1. A portable computer comprising in combination:

a housing having first and second compartments connected by hinge means for pivoting the compartments to relative open and closed positions;

means at least partially located within the first housing compartment for displaying information when the compartments are in the open position;

a manual keyboard arranged within the second housing compartment;

a cellular telephone arranged within one of the housing compartments;

a modem arranged within one of the housing compartments for modulating/demodulating signals fed to and from the cellular telephone; and

an antenna arranged within the first housing compartment for transmitting/receiving signals from the cellular telephone.

2. A portable computer according to Claim 1 wherein the antenna is extendable from the first housing compartment, the computer further comprising radiation shielding substantially surrounding that portion of the antenna which remains within the housing.

3. A portable computer according to Claim 2 further comprising a microphone and a speaker arranged at least partially within the housing and operably connected to the cellular telephone for transmitting/receiving voice signals.

4. A portable computer according to claim 1 further comprising a microphone and a speaker arranged at least partially within the housing and operably connected to the cellular telephone for transmitting/receiving voice signals.

5. A data network comprising a plurality of computers, at least one of the computers within the network including in combination;

a housing;

a cellular telephone arranged within the housing;

a modem arranged within the housing for modulating/demodulating signals fed to and from the cellular telephone; and

means for transmitting/receiving signals from the cellular telephone; wherein the at least one computer communicates with the other computers of the plurality through the cellular telephone.

6. A data network according to Claim 5 wherein the means for transmitting/receiving comprises an antenna arranged within and extendable from the housing.

7. A computer comprising in combination:

means for displaying information;

a keyboard for manual input of information into the computer;

a cellular telephone;

a modem for modulating/demodulating signals fed to and from the cellular telephone; and

an antenna for transmitting/receiving signals from the cellular telephone.

8. A computer according to Claim 7 further comprising radiation shielding substantially blocking direct radiation from the antenna to the rest of the computer.

9. A computer according to Claim 8 further comprising microphone and a speaker operably connected to the cellular telephone for transmitting/receiving voice signals.

10. A computer according to Claim 7 further comprising a microphone and a speaker operably connected to the cellular telephone for transmitting/receiving voice signals.

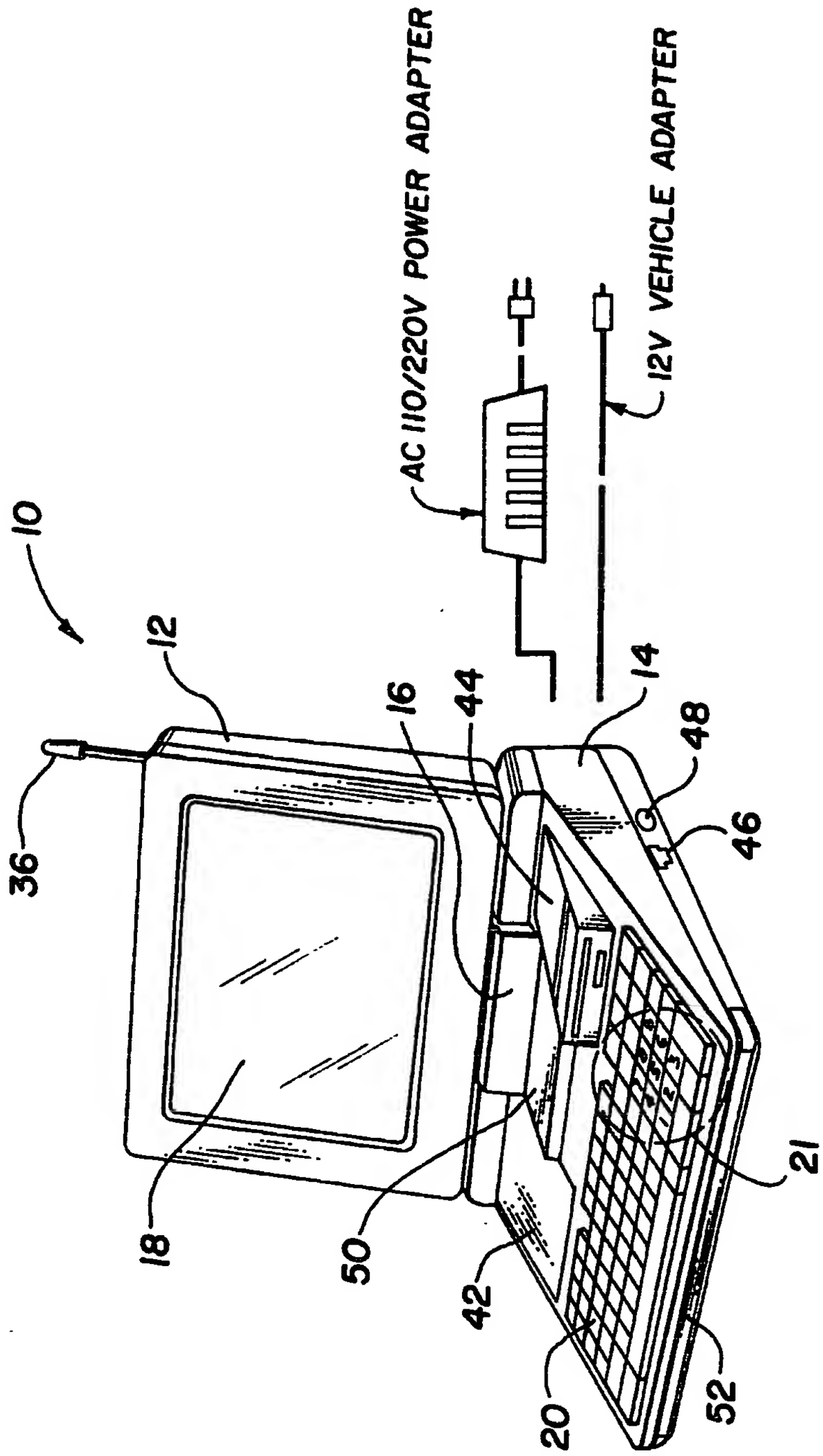

AC 110/220V POWER ADAPTER
12V VEHICLE ADAPTER
10
12
14
16
18
20
21
36
42
44
46
48
50
52

Fig. 1

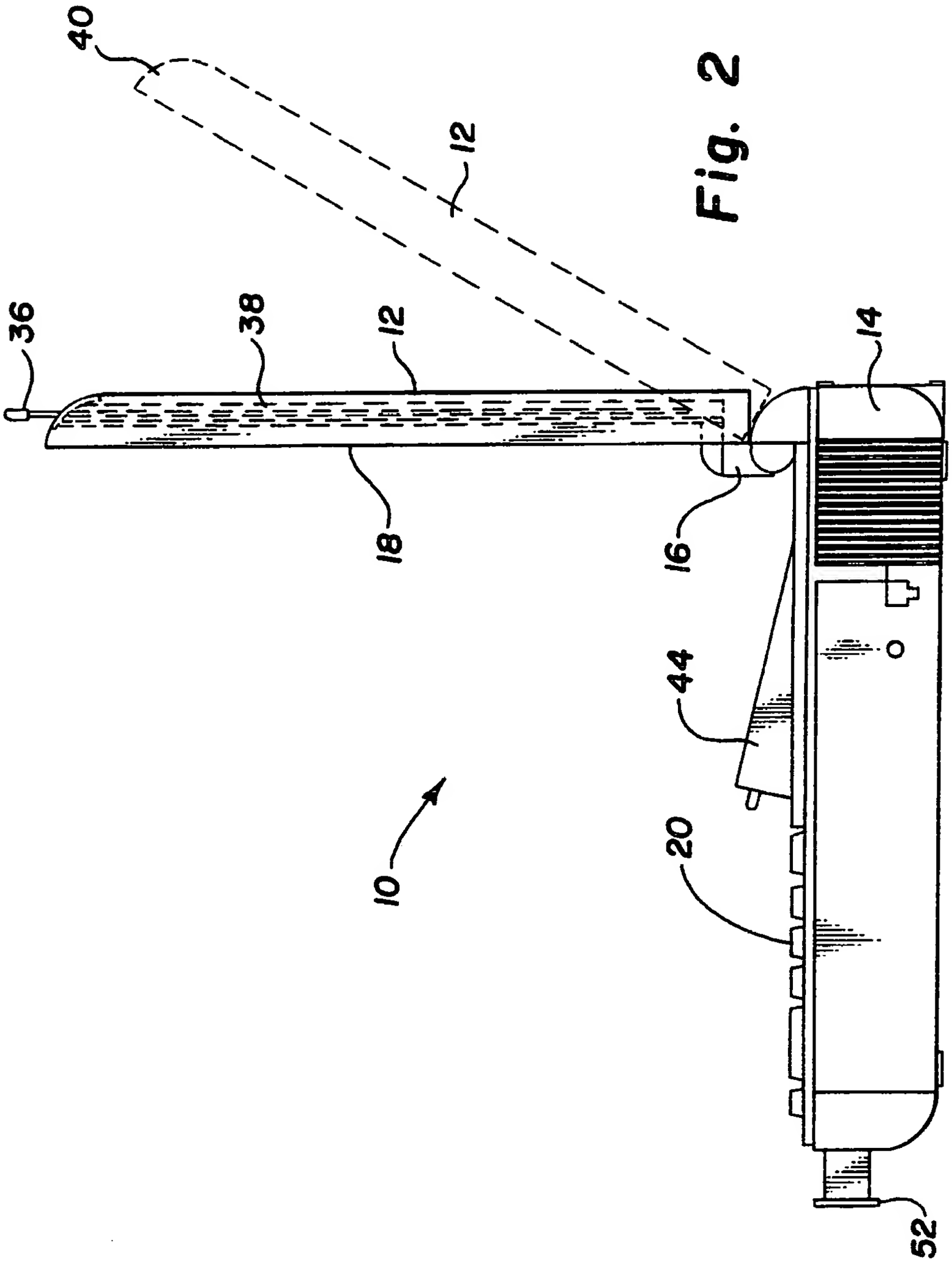
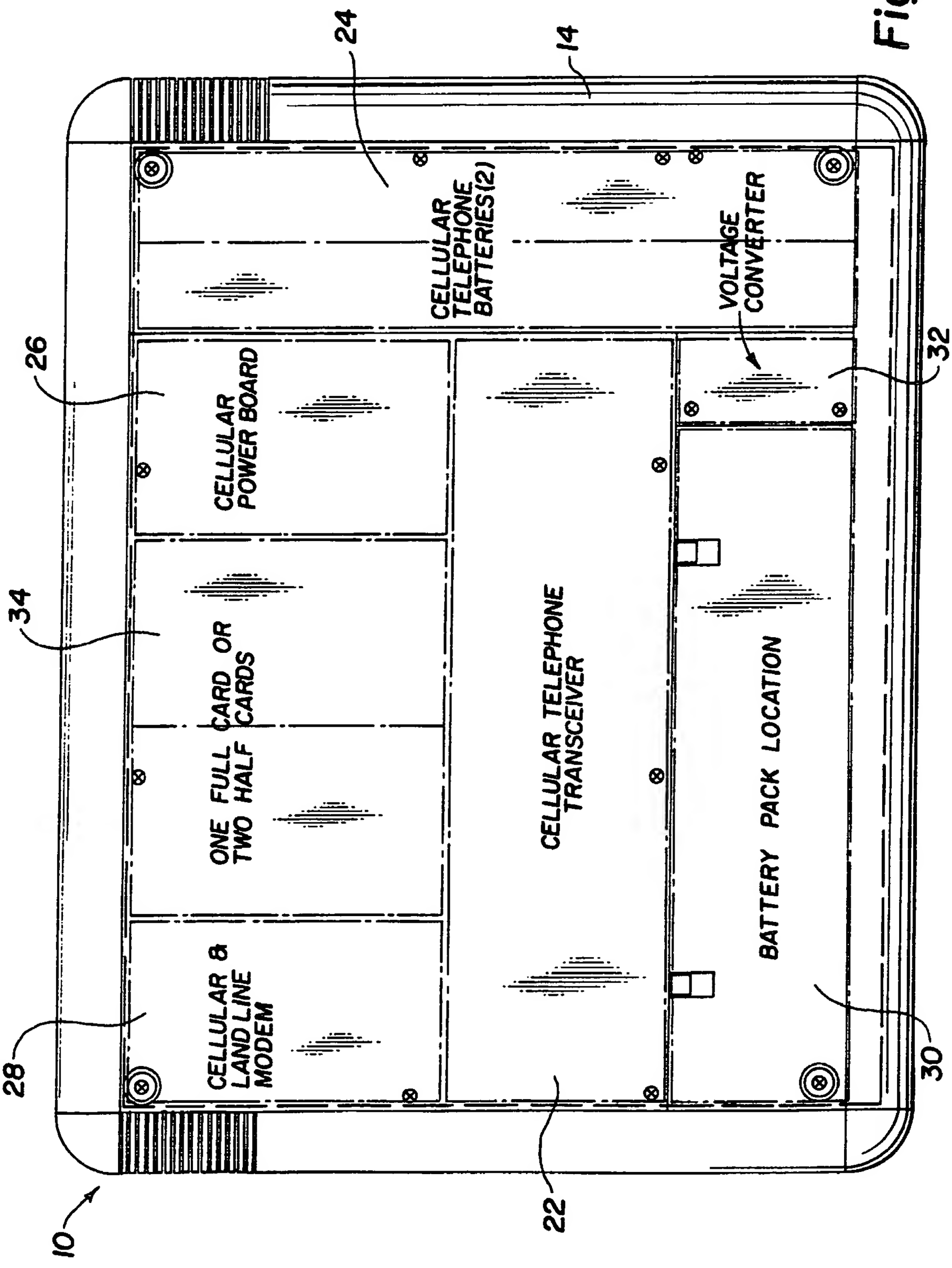


Fig. 2

Fig. 3


24
14
CELLULAR TELEPHONE BATTERIES(2)
VOLTAGE CONVERTER
26
CELLULAR POWER BOARD
32
34
ONE FULL CARD OR TWO HALF CARDS
CELLULAR TELEPHONE TRANSCEIVER
BATTERY PACK LOCATION
28
CELLULAR & LAND LINE MODEM
30
22
10

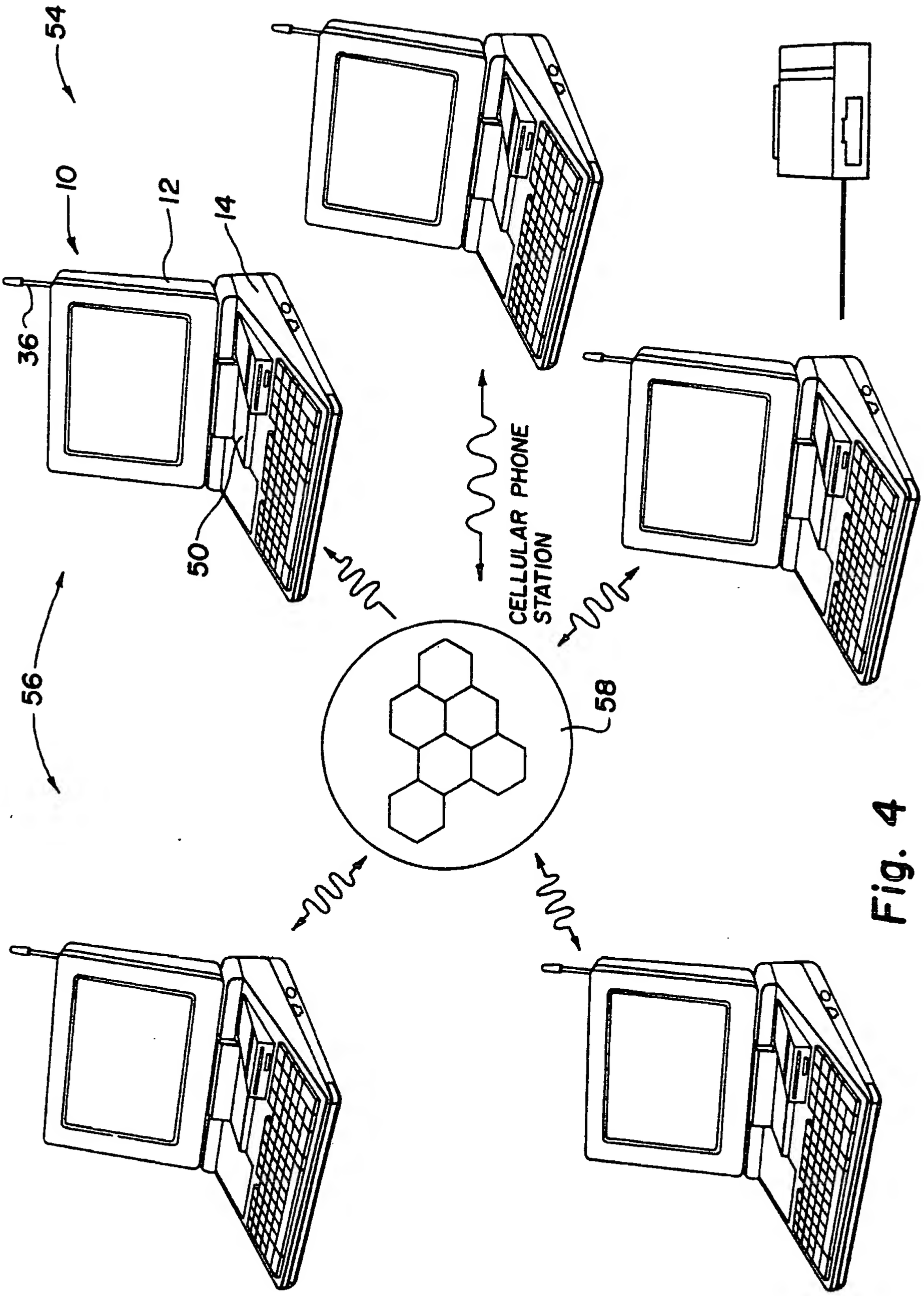


Fig. 4

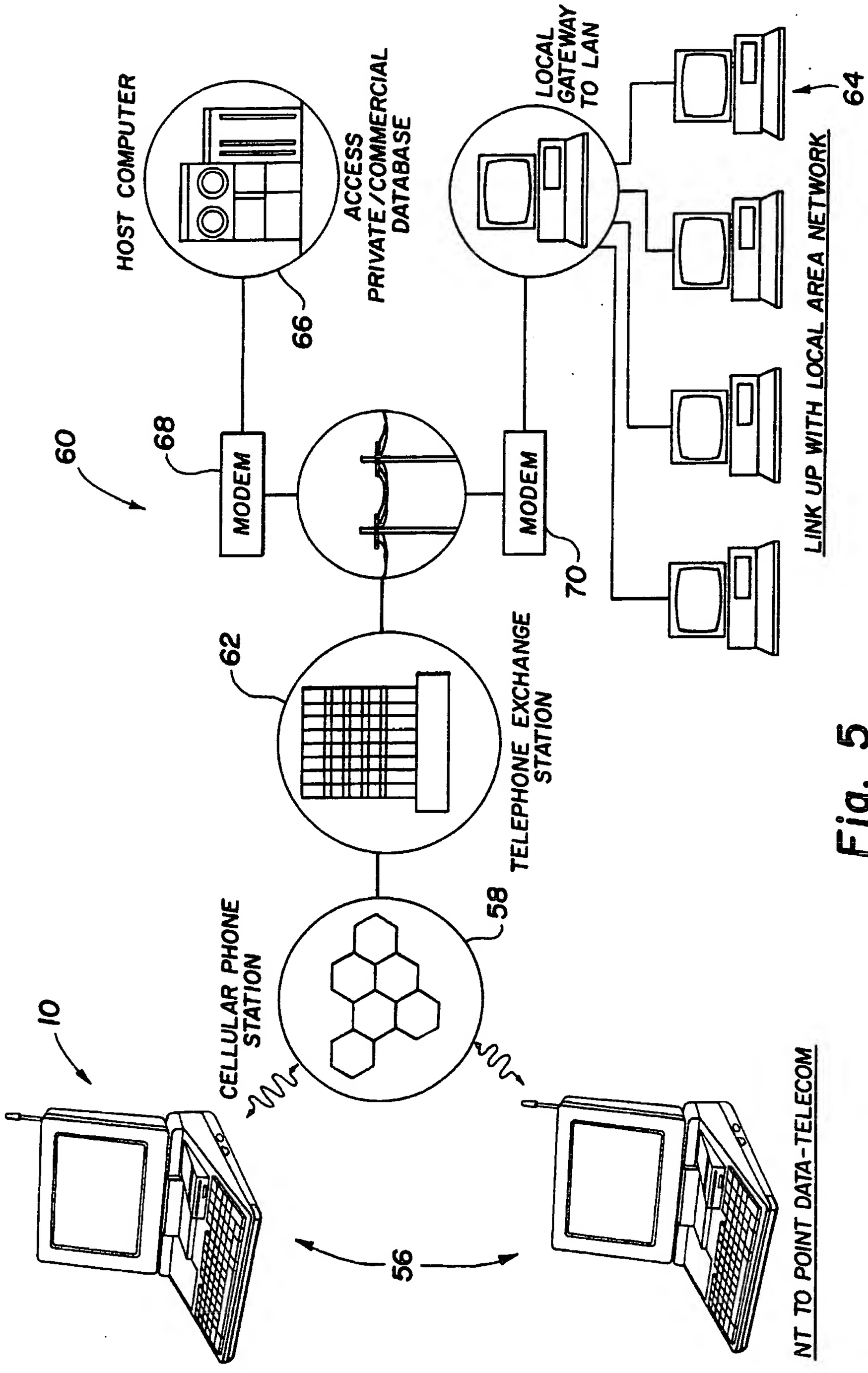

HOST COMPUTER
ACCESS PRIVATE/COMMERCIAL DATABASE
66
LOCAL GATEWAY TO LAN
64
LOCAL AREA NETWORK
LINK UP WITH LOCAL
60
68
MODEM
MODEM
70
62
TELEPHONE EXCHANGE STATION
58
CELLULAR PHONE STATION
10
56
NT TO POINT DATA-TELECOM

Fig. 5

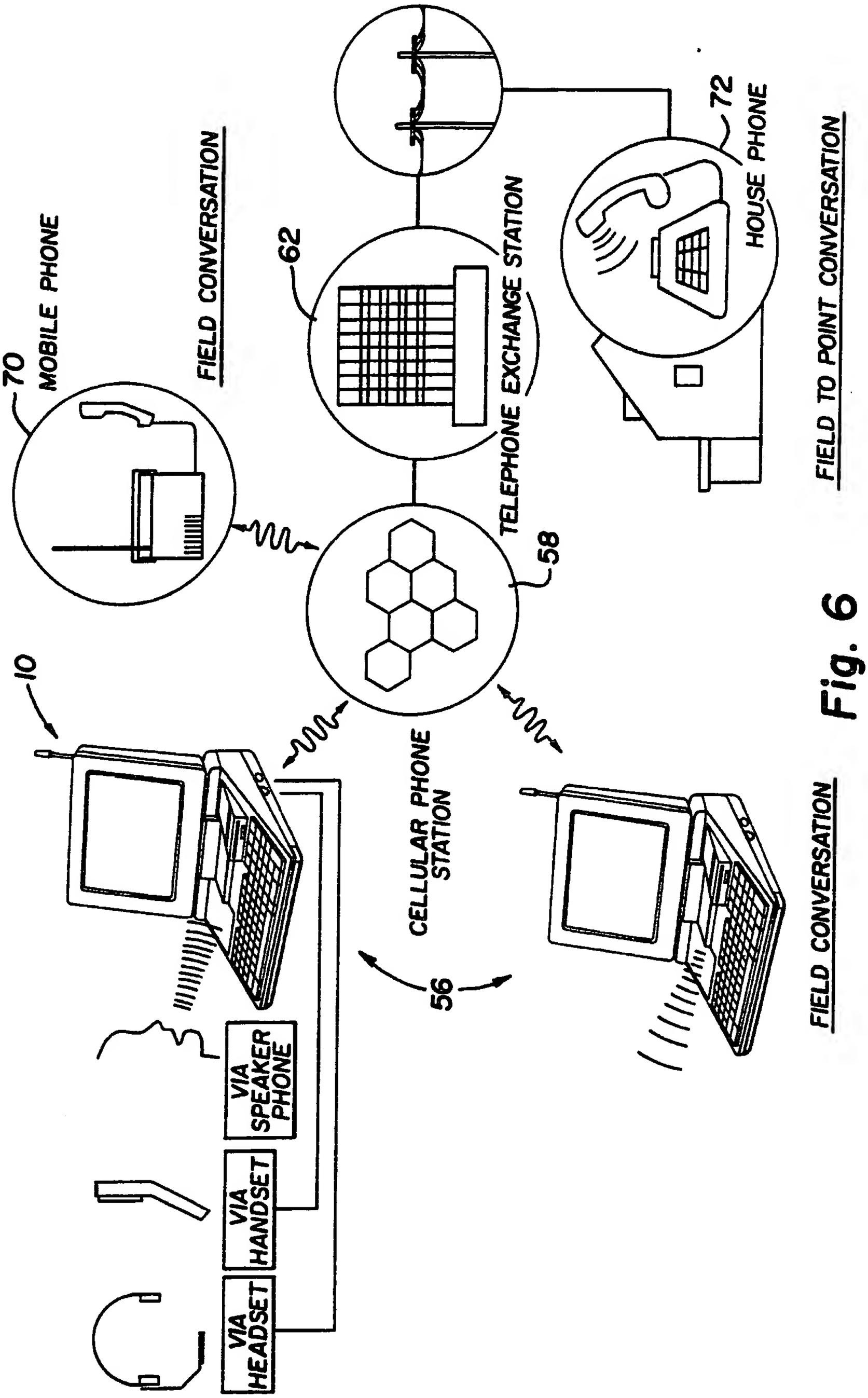

FIELD CONVERSATION
70
MOBILE PHONE
62
TELEPHONE EXCHANGE STATION
72
HOUSE PHONE
FIELD TO POINT CONVERSATION
TELEPHONE
58
10
CELLULAR PHONE STATION
56
VIA SPEAKER PHONE
VIA HANDSET
VIA HEADSET
FIELD CONVERSATION

Fig. 6

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US89/04057

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC(4): G01D 15/00

U.S.CL.: 364/708

II FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	364/705.01, 705.05, 708; 379/58, 59, 90, 96; 445/33

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	US, A, 4,479,198 (ROMANO et al.) 23 OCTOBER 1984 See column 2, lines 27-46.	2,3,8,9
Y	US, A, 4,571,456 (PAULSEN et al.) 18 FEBRUARY 1986 See the entire document.	1-10
X Y	US, A, 4,661,659 (NISHIMURA) 28 APRIL 1987 See the entire document.	5-7, 10 1-4, 8,9
X Y	US, A, 4,697,281 (O'SULLIVAN) 29 SPETEMBER 1987 See the entire document	7 and 10 1-6 and 8,9
X Y	US, A, 4,823,362 (ETOH) 18 APRIL 1989 See the entire document.	7 and 10 1-6, 8 and 9

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search

31 OCTOBER 1989

Date of Mailing of this International Search Report

04 JAN 1990

International Searching Authority

ISA/US

Signature of Authorized Officer

DALE M. SHAW

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
X	US, A, 4,837,590 (SPRAQUE) See the entire document.	1-10
A	PCT, A, WO86/00775 (LABEDZ) See the entire document.	1-10
A	NISHIYAMA et al., "The Portable Data Display Terminal VC-350" National Technical Report Vol. 19, #6 pp624-631 DECEMBER 1973 (JAPAN)	1-10
A	Norand 120 Portable FM Terminal Data Transceiver Network, pp 12A-12F, 1985 Norand Corp. Cedar Rapids Iowa, USA	1-10

06 JUN 1989